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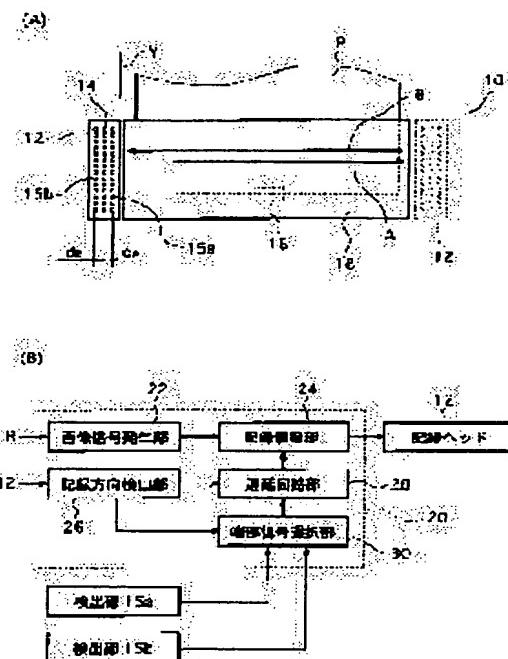
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**(54) METHOD AND APPARATUS FOR RECORDING IMAGE**

(57) Abstract:

**PROBLEM TO BE SOLVED:** To provide a method and an apparatus for recording an image capable of forming an edgeless print without scumming of an outer area of an image receiving medium by an image forming substance such as an ink or the like without using a wasteful image receiving medium or ink in an ink jet recording system for recording the image thereafter with the substance on the medium.

**SOLUTION:** In image recording for recording an image on an image receiving medium by transferring an image forming substance to the medium based on an image signal, the substance is transferred only to a present area of the medium based on present area information of the medium, thereby eliminating its fault.



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## CLAIMS

## [Claim(s)]

[Claim 1] The image recording approach characterized by shifting the image formation matter to said television medium in the image recording approach which records an image only in the existence region of a television medium based on the existence region information on said television medium by shifting the image formation matter to a television medium based on a picture signal.

[Claim 2] The image recording approach according to claim 1 of acquiring said existence region information by detection of said television medium.

[Claim 3] The image recording approach according to claim 1 or 2 that the ratio of the die length of the image in said picture signal and the die length of said television medium of the corresponding direction is 0.99 or more by "the picture signal / television medium."

[Claim 4] The image recording approach according to claim 1 to 3 that the ratio of spacing of the edge of an image and the edge of a television medium which were recorded on said television medium, and the die length of the television medium of the corresponding direction is 0.005 or less by "spacing / the television medium die length" with an edge.

[Claim 5] The image recording approach according to claim 1 to 4 that the ratio of spacing of the edge of an image and the edge of a television medium which were recorded on said television medium, and the die length of the television medium of the corresponding direction is 0.005 or less by "spacing / the television medium die length" with an edge, and the difference of the maximum of said ratio and the minimum value is 0.003 or less.

[Claim 6] The image recording approach according to claim 1 to 5 which starts shift of said image formation matter on the basis of the edge of the detected television medium while edge detection of a television medium detects the existence region of said television medium and performing read-out of said picture signal to the fixed timing corresponding to image recording.

[Claim 7] The image recording approach according to claim 1 to 5 which starts shift of said image formation matter on the basis of the edge of the detected television medium while edge detection of a television medium detects the existence region of said television medium and starting read-out of a picture signal to the predetermined timing according to said edge detection.

[Claim 8] Having the migration means to which the recording head which has the nozzle which shifts the image formation matter to a television medium, said recording head, and a television medium are moved relatively, and said migration means performing relative migration Based on a picture signal, the image formation matter is shifted to a television medium from said nozzle. Are image recording equipment which records an image on said television medium, and on either [ at least ] the upstream of the nozzle in the relative migration direction by said migration means, or a lower stream of a river. Image recording equipment characterized by having said recording head and the television medium detection means constituted in one, and having the control means which controls said recording head further according to detection of the television medium by said television medium detection means to shift the image formation matter only to the existence region of a television medium.

[Claim 9] Image recording equipment according to claim 8 whose number of the detection means

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in either [ at least ] the upstream of said nozzle or a lower stream of a river is below the number of the nozzles of the relative migration direction by said migration means, and the direction which intersects perpendicularly.

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001] [Field of the Invention] This invention belongs to the field of image recording, such as an ink jet recording method which shifts the image formation matter to a television medium, and records an image, and relates to the image recording approach and image recording equipment which make it possible to create an edge-less print suitably by an ink jet recording method etc. in detail.

[0002] [Description of the Prior Art] The color printer which outputs the image inputted into the personal computer etc. and the processed image as a print (hard copy) has an ink jet printer using the ink jet recording method which records an image in use by breathing out ink from a nozzle and shifting to television media, such as television paper. Moreover, the image by the ink jet recording method has come to acquire the image quality near a film photo in recent years by advance of an image processing technique and a record technique.

[0003] By the way, the so-called edge-less print with which there is no white frame etc. in the surroundings of an image, namely, the image was recorded to the edge (edge) of a print with the photograph (photoprint) of usual sizes, such as L size, is main. Such an edge-less print is created by the approach of cutting off a circumference part after image exposure (a perforation form being included), and the method of performing image exposure (burned) more greatly to printing paper. Also in the print creation by the ink jet recording method, it is possible to create an edge-less print according to these approaches.

[0004] However, when creation of the above-mentioned edge-less print is used for an ink jet recording method, it is necessary to result in consuming excessive ink and television paper, and to collect the cut-off television papers further by the approach of cutting off the edge of television paper after image recording. Therefore, this approach is economically disadvantageous. On the other hand, by the approach of performing image recording more greatly than television paper, since the image of a periphery is not restored to a television paper field, the ink breathed out by the outside of television paper will adhere to the member of the conveyance path of television paper, or the circumference. Consequently, by this approach, the ink adhering to poor conveyance, a conveyance path, etc. of television paper produces un-arranging [of adhering to the rear face of the television paper with which image recording is presented after this]. Furthermore, it results in consuming too excessive ink also by this approach.

[0005] [Problem(s) to be Solved by the Invention] In image recording, such as an ink jet recording method which the purpose of this invention has in solving the trouble of said conventional technique, shifts the image formation matter to a television medium, and performs image recording. There is also no dirt of the television medium external field by image formation matter, such as ink, without using a television medium, ink, etc. vainly, an image is to offer the image recording approach which can create the print (edge-less print) with which until [ marginal (edge) full ] record of the television medium was carried out, and the image recording equipment using this image recording approach.

## [0006]

[Means for Solving the Problem] In order to attain said purpose, the image recording approach of this invention offers the image recording approach characterized by shifting the image formation matter to said television medium in the image recording approach which records an image only in the existence region of a television medium based on the existence region information on said television medium by shifting the image formation matter to a television medium based on a picture signal.

[0007] Moreover, the die length of an image [in / it is desirable to acquire said existence region information by detection of said television medium and / said picture signal]. Spacing of the edge of an image and the edge of a television medium where it was desirable at which that a ratio with the die length of said television medium of the corresponding direction was 0.99 or more by "the picture signal / television medium", and it was recorded on said television medium. Spacing of the edge of an image and the edge of a television medium where it was desirable at which that a ratio with the die length of the television medium of the corresponding direction was 0.005 or less by "spacing / the television medium die length" with an edge, and it was recorded on said television medium. A ratio with the die length of the television medium of the corresponding direction is 0.005 or less by "spacing / the television medium die length" with an edge. And it is desirable that the difference of the maximum of said ratio and the minimum value is 0.03 or less. While edge detection of a television medium detects the existence region of said television medium and performing read-out of said picture signal to the fixed timing corresponding to image recording it is desirable to start shift of said image formation matter on the basis of the edge of the detected television medium. Furthermore, while edge detection of a television medium detects the existence region of said television medium and starting read-out of a picture signal to the predetermined timing according to said edge detection, it is desirable to start shift of said image formation matter on the basis of the edge of the detected television medium.

[0008] The recording head which has the nozzle with which the image recording equipment of this invention shifts the image formation matter to a television medium. Having the migration means to which said recording head and television medium are moved relatively, and said migration means performing relative migration Based on a picture signal, the image formation matter is shifted to a television medium from said nozzle. Are image recording equipment which records an image on said television medium, and on either [at least] the upstream of the nozzle in the relative migration direction by said migration means, or a lower stream of a river It has said recording head and the television medium detection means constituted in one. Further The image recording equipment characterized by having the control means which controls said recording head to shift the image formation matter only to the existence region of a television medium according to detection of the television medium by said television medium detection means is offered.

[0009] Moreover, it is desirable that the number of the detection means in either [at least] the upstream of said nozzle or a lower stream of a river is below the number of the regurgitation nozzles of the relative migration direction by said migration means and the direction which intersects perpendicularly.

[0010] [Embodiment of the Invention] Hereafter, the image recording approach of this invention and image recording equipment are explained to a detail based on the suitable example shown in an attached drawing.

[0011] The conceptual diagram of an example of the image recording equipment of this invention which enforces the image recording approach of this invention to drawing 1 is shown. In addition, in drawing 1, (A) is drawing showing the outline block diagram of the control section 20 which controls the image recording section 10 (B) is indicated to be to (A) in the outline top view of the image recording section 10 of this image recording equipment, respectively.

[0012] The image recording equipment (it considers as a recording apparatus hereafter) shown in drawing 1 records an image on the television paper P by the ink jet recording method. In addition,

the recording device of the example of illustration concerning this invention performs image

recording like the usual ink jet printer according to edge detection of the television paper by the television paper end detecting element 15 mentioned later except controlling the regurgitation (image recording field) of the ink from each nozzle 14 of a recording head 12. Therefore, it has the same usual configuration and same usual operation as an ink jet printer fundamentally except the above-mentioned difference.

[0013] In addition, in this invention, limitation is not carried out to the television paper P, but various kinds of objects of a television medium, such as cloth, a film, plastics, a metal, and a pawl, are available. Moreover, this invention is available to the spreading recording method which flows ink out of a nozzle, applies to a television medium, and records an image besides an ink jet recording method.

[0014] The comparatively small recording head 12 is used for the recording device shown in drawing 1.

Migration to the main scanning direction (the main scanning direction B shown by the main scanning direction A shown by the drawing Nakaya mark A, and the arrow head B) of this recording head 12. Scanning the television paper P two-dimensional by the recording head 12 combining constant \*\*\*\*\* of the television paper P to the direction of vertical scanning (the direction of drawing Nakaya mark Y) which intersects perpendicularly with a main scanning direction 1 It is the ink jet printer which breathes out ink on the television paper P from a nozzle 14 according to a picture signal, and performs image recording. That is, after arranging the television paper P on a predetermined location, an image is recorded on the television paper P by repeating „constant \*\*\*\*\* of the record -> television paper P to the constant \*\*\*\*\* -> main scanning direction B of the record -> television paper P to a main scanning direction A.”

[0015] In the example of illustration, two or more nozzles 14 which carry out the regurgitation of the ink which is the image formation matter to the television paper P are arranged in the direction of vertical scanning, and a recording head 12 has them in it (it sets for the example of illustration and they are 14 pieces as an example). In addition, in the example of illustration, although the nozzle 14 is expressed by one in order to make drawing brief and to make a configuration clear, this recording device records a color picture. Therefore, each nozzle 14 is arranged in a main scanning direction, and has cyanogen (C), a Magenta (M), yellow (Y), and four black (K) nozzles.

[0016] As shown in drawing 1 (A), corresponding to each nozzle 14, television paper end detecting element 15a (hereafter referred to as detecting-element 15a) is arranged [ in a recording head 12 ] in the direction of vertical scanning at the downstream of the main scanning direction A of a nozzle 14 at homotopic. Moreover, television paper end detecting-element 15b (hereafter referred to as detecting-element 15b) is arranged similarly at the downstream of a main scanning direction B. Both the detecting elements 15 perform edge detection of the television paper P. This point is explained in full detail behind.

[0017] As mentioned above, although moved to a main scanning direction (the direction of A, and the direction of B) in the case of the image recording to the television paper P, in this moving method, there is especially no limitation of 12 recording head, and it should just be based on well-known approaches used with the usual ink jet printer, such as an approach using a belt or a pulley, and an approach by screw transmission, at it.

[0018] Constant \*\*\*\*\* (intermittent conveyance of every the specified quantity) of the television paper P is carried out in the direction of vertical scanning including the scan field (image recording location) by the recording head 12. What is necessary is for there to be especially no limitation also in the conveyance approach of the television paper P, and just to twist the conveyance approach, a band conveyor, etc. using a roller to the well-known approach used with the usual ink jet printer.

[0019] Moreover, in the middle of the conveyance path of the television paper P, the tip detecting element 16 which detects the tip of the direction of vertical scanning of the television paper P is arranged. A recording device detects that the television paper P was conveyed in the predetermined location of a scan field by this tip detecting element 16, and starts the image recording by the ink jet recording method which combined migration and constant \*\*\*\*\* of the above-mentioned recording head 12. In addition, especially limitation may not be in the tip detection approach of the television paper P by the tip detecting element 16, and the optical

detection approach may be used also by the mechanical detection approach.  
[0020] In the scan field by the recording head 12, the light source 18 for detection is arranged to a recording head 12 at the rear-face side of the television paper P. The light source 18 for detection is the light source which uses a fluorescent lamp, a halogen lamp, etc. and irradiates detection light for said detecting element 15 to perform edge detection of the television paper P toward the television paper P in the scan field by the recording head 12 at least. That is, the detecting element 15 of the example of illustration has a photo detector, by re-light-receiving of the detection light by which the detection light in the television paper P was shaded and shaded accompanying migration to the main scanning direction of a recording head 12, it detects the edge of the television paper P, detects an existence region, and acquires existence region information.

[0021] In addition, in this invention, limitation is not carried out to detecting an existence region using the protection from light in the television paper P using the light source and the photo detector which are arranged on both sides of the television paper [like the example of illustration] P whose detection means of the existence region of the television paper P is, but the detection means of various kinds of sheet-like objects is available. For example, the existence region of the television paper P may be detected using the reflected light from the television paper P using the light source and a photo detector, or the existence region of the television paper P may be detected using the Rhine CCD sensor or an area CCD sensor so that it may illustrate later.

[0022] The image recording by such the image recording section 10 is controlled by the control section 20 as shown in drawing 1(B). A control section 20 has the picture signal generating section 22, the record control section 24, the record direction detecting element 26, the delay circuit section 28, and the edge signal selection section 30, and is constituted. Hereafter, by explaining an operation of the recording device shown in drawing 1 explains this invention to a detail more, explaining at least each part of this control section 20.

[0023] The picture signal generating section 22 is a part which generates the picture signal corresponding to the image recording according the picture signal (image data) of the image recorded from the image data sources of supply R, such as a personal computer and a scanner, to the recording device of reception and the example of illustration. The picture signal generated in this picture signal generating section 22 is read to the record control section 24. This record control section 24 is explained in full detail behind.

[0024] Here, in this invention, as for this picture signal generating section 22, a main scanning direction and the direction of vertical scanning generate a picture signal so that the ratio of the die length of the image in a picture signal and the die length of a television medium may become desirable more preferably 0.998 or more 0.99 or more by “the picture signal / television medium.” That is, a picture signal is generated so that the die length of the image in a picture signal may become 99% or more of the television paper P. An image can be recorded to the limit of the edge of the television paper P thereby more suitably, and a high-definition edge-less print can be obtained. In addition, although there is especially no limitation in the upper limit of this ratio, if it becomes not much large, since the image field reproduced on the television paper P will become narrow to a subject-copy image, it is desirable to generate a picture signal so that 1.1 may not be exceeded.

[0025] It detects whether the record direction detecting element 26 is recording the image for whether the record direction 12 of an image, i.e., a recording head, is recording the image (moving) on the main scanning direction A on the main scanning direction B from the recording head 12 (or the migration means). The record direction detecting element 26 supplies this detection result to the delay circuit section 28 and the edge signal selection section 30.

[0026] On the other hand, the output signal from the above-mentioned detecting element 15 is sent to the edge signal selection section 30. The edge signal selection section 30 chooses detecting-element 15b respectively, when image recording is being performed to the main scanning direction A and image recording is being performed for detecting-element 15a to the main scanning direction B according to the record direction supplied from the record direction detecting element 26, and it sends the signal to the delay circuit section 28.

[0027] Although it shifts to the edge of the television paper P, only proper time amount (time delay t) delays the ink breathed out from the corresponding nozzle 14, and the delay circuit section 28 sends the signal of edge detection to a record control section 24, after it receives the information on the record direction supplied from the record direction detecting element 26, and the signal of the detecting element 15 which the edge signal selection section 30 chose and a detecting element 15 detects the edge of the television paper P. Or when migration of a recording head 12 is being controlled by the pulse, it changes into a time delay and the number of PASURU is also available.

[0028] As mentioned above, if what the television paper P was conveyed for by the position is detected by the tip detecting element 16, migration to the main scanning direction of a recording head 12 will be performed, and image recording will be started. Moreover, corresponding to each nozzle 14, detecting-element 15a is arranged at the downstream of a main scanning direction A, and detecting-element 15b is arranged in the recording head 12 at the downstream of a main scanning direction B at the homotopic of the direction of vertical scanning, respectively. Passing speed VA to the main scanning directions A and B of the recording head [although it is natural, set to a recording device, and ] 12 at the time of record And VB and distance dA to the nozzle 14 (each nozzle of C, M, Y, and K) which corresponds from a detecting element 15 And dB is known.

[0029] Therefore, it is  $t_1$  about the flight time amount of the ink from the nozzle 14 to the television paper P. If it carries out if it is record of a main scanning direction  $A \rightarrow dA / (VA)t_1$ . After detecting-element 15a detects the edge of the upstream of the television paper A (protection from light in the television paper P) Proper time amount until it shifts the ink breathed out from the corresponding nozzle 14 to the edge of the television paper P, (And the proper time amount  $tA$ , i.e., a time delay, after detecting-element 15a detects the edge of the downstream of the television paper P (re-light-receiving), until it shifts the ink breathed out from the corresponding nozzle 14 to the edge of the television paper P It is computable. Is record of a main scanning direction B, they are  $dB / (VB)t_1$ . Time delay tB It is computable. In the recording device of the example of illustration, the delay circuit section 28 delays only the corresponding time delay t according to the information on the record direction from the record direction detecting element 14 after edge detection of the television paper P by the detecting element 15 which the edge signal selection section 30 chose and supplied, and sends the detecting signal of an edge to the record control section 24. The record control section 24 starts the regurgitation of ink from the nozzle 14 to which a recording head 12 is equivalent according to the detecting signal of this edge, and stops the regurgitation of ink (or the delay circuit section 28 may be lost and the regurgitation of ink and a halt may be controlled in the record control section 24 according to edge detection and a time delay t).

[0030] Therefore, in this recording device, ink is not breathed out in the field in which a nozzle 14 does not scan the television paper P. Moreover, in the field in which a nozzle 14 (detecting element 15) scans the television paper P just before a nozzle 14 reaches an edge, the regurgitation of ink is stopped. Therefore, without carrying out the regurgitation of the ink to fields other than the television paper P, an image is recorded to the limit of an edge, and an edge-less print can be created.

[0032] In this invention, without producing dirt of a periphery, ink, futility of the television paper P, etc. in ink by acquiring the existence region information on the television paper P, and, for example, controlling the regurgitation of the ink from a recording head (nozzle) by such edge detection, it made it record the until [marginal (edge) full] image of television paper, and creation of a good edge-less print is realized. The voice especially shown in drawing 1 — the voice which unified the recording head and a detection means to detect the television paper P so that like — what is necessary is to respond to the predetermined time delay t, and just to start or stop the regurgitation of ink, after it sets like and a detection means detects the edge of the television paper P. Therefore, an edge-less print can be created by easy control, without carrying out the regurgitation of the ink to fields other than the television paper P. And an edge-less print can be created suitably, without producing surrounding dirt, without carrying out the

regurgitation of the ink out of the field of the television paper P, also when according to this invention which controls the regurgitation of ink according to the existence region information on the television paper P the television paper P has been arranged aslant, there is no television paper P in fixed forms, such as a heart mold and a round shape, and the television paper P has a hole and damage.

[0033] Here, although the record control section 24 reads a picture signal from the record signal generator 22, a recording head 12 is controlled according to edge detection of this picture signal and said television paper P and ink is made to breathe out from each nozzle 14, the following approaches are preferably illustrated as the read-out timing of the picture signal in this case, and the control approach of the ink regurgitation.

[0034] First, it is not based on edge detection of the television paper P, but the approach of starting the regurgitation of initiation, i.e., ink, is illustrated in image recording according to the picture signal which started read-out of a picture signal, read one by one, and was read from the time of a recording head 12 coming to the predetermined location of a main scanning direction according to edge detection of the television paper P by the detecting element 15 at the time according to migration of a recording head 12. According to this approach, by easy control, the loss of a picture signal can be lessened and an image can be recorded.

[0035] Moreover, according to edge detection of the television paper P, read-out of a picture signal is started and the approach of starting the regurgitation of initiation, i.e., ink, is also preferably illustrated in image recording, therefore, when the television paper P inclines and is arranged in the above-mentioned example, in the television paper P edge of the migration direction upstream of a recording head 12 By this approach, the image of the same pixel number is recorded on this edge in a main scanning direction to the image of a pixel number which is different in a main scanning direction being recorded (in the image which the picture signal generating section 22 generated, the same Rhine of the direction of vertical scanning comes to this edge). Although according to this approach an image is distorted according to an inclination when the television paper P inclines and has been arranged if an inclination is in tolerance, the proper edge-less print which senses neither the inclination of an image nor distortion can be created.

[0036] Moreover, as for the record control section 24, it is desirable to control the regurgitation of the ink by the recording head 12 so that the ratio of spacing of the edge of the image with which the main scanning direction and the direction of vertical scanning were recorded on the television paper P according to detection of the television paper P by the detecting element 15, and the edge of the television paper P, and the die length of the television paper P may become 0.005 or less by "spacing / the television medium die length" of an edge. That is, as for a main scanning direction and the direction of vertical scanning, it is desirable to perform image recording so that an edge may not exceed 0.5% of the die length of the television paper P. More preferably, after fulfilling the above-mentioned conditions, the ink regurgitation by the recording head 12 is controlled so that the difference of the maximum of the above-mentioned ratio and the minimum value becomes 0.003 or less.

[0037] By fulfilling the above-mentioned conditions, an edge is not more conspicuous, or it is stabilized and the high-definition edge-less print which does not have an inclination further can be recorded. In addition, when the inclination (namely, inclination of the television paper P) of an image exceeds tolerance, image processings, such as rearrangement of a pixel, may be performed in record control-section 24 grade, and image recording which amended the inclination may be performed, or, the signal of the purport whose supply of the television paper P is unsuitable nature may be emitted, and redo of image recording may be directed.

[0038] In the example of illustration, although the recording head 12 has the detecting element 15 on both sides whose nozzles 14 the main scanning direction pinched corresponding to all the nozzles 14, limitation is not carried out to this but various kinds of modes of this invention are available. For example, what is necessary is to form a detecting element 15 only in the downstream of the main scanning direction, if it is equipment which performs image recording by record of only the any 1 direction of main scanning directions A and B in order that it may prevent the image quality fall resulting from the backlash of a recording head 12 migration means

etc., although the recording device shown in drawing 1 is equipment which performs image recording in both directions of main scanning directions A and B.

[0039] Moreover, corresponding to each nozzle 14, the edge of the television paper P may be detected by interpolating in between by forming a detecting element 15 every other 1 two to a nozzle 14 by not carrying out limitation to arranging a detecting element 15 corresponding to all the nozzles 14, either. It is arranged proper, without the television paper P inclining, and an edge-less print can be created, without producing contamination of the perimeter in ink etc. if there is a location detection means of the direction of vertical scanning of the television paper P like the tip detecting element 16, and it has at least one detecting element in the downstream of the migration direction of a recording head to a nozzle 14.

[0040] An example of the mode which arranges a detecting element to drawing 2 corresponding to no nozzles 14 is shown. In addition, since the example shown in drawing 1 has the same configuration as the example fundamentally shown in drawing 1 except that the location and configuration of a detecting element differ from each other, the same sign is given to the same member, and the following explanation mainly performs a different part.

[0041] The example shown in drawing 2 is an example which formed the detecting element (television paper end) 32 in the downstream of a main scanning direction A and a main scanning direction B only corresponding to the nozzle 14 of the maximum upstream of the direction of vertical scanning, and the lowest style. Moreover, in the example shown in drawing 2, as it has light-emitting part 32a and light sensing portion 32b, and the television paper P is not detected but it is shown in drawing 2 (B) by protection from light in the television paper P like the above-mentioned example, a detecting element 32 is injected from light-emitting part 32a, and detects the television paper P by detecting the light reflected by the television paper P by light sensing portion 32b.

[0042] In this example, by detecting the location of the direction of vertical scanning of the television paper P, being the detecting element 32 of two points from which a location differs in the direction of vertical scanning, and detecting the location (edge) of the main scanning direction of the television paper P, the existence region of the television paper P is detected and an edge-less print is created by detection of the amount of conveyances by the tip detecting element 16 and the conveyance means of the television paper P. According to the location of the television paper P of the direction of vertical scanning, only the nozzle 14 which exists in a television paper P field is more specifically chosen. By migration of the main scanning direction of a recording head After a detecting element 32 detects the edge of the television paper P (light-receiving), start the regurgitation of ink from the nozzle 14 chosen after the predetermined time delay t passed, and it sets at the edge by the side of reverse. After a detecting element P detects an edge (light-receiving termination), and a predetermined time delay passes, by stopping the regurgitation of ink, ink is breathed out only to the existence region of the television paper P, and an edge-less print is created.

[0043] Moreover, since interpolation etc. can be performed and the edge of the television paper P in the location corresponding to each nozzle 14 can be detected also when the television paper P inclines and it has been arranged in this way by preparing the detecting element of two or more points in the direction of vertical scanning, it prevents carrying out the regurgitation of the ink out of the field of the television paper P stably, and an edge-less print can be created.

[0044] the so-called page on which limitation was not carried out for this invention to this, but many nozzles were arranged in the main scanning direction although the above example was a recording device which performs image recording of an ink jet recording method by constant-\*\*\*\*\*\*(ing) television paper P using the comparatively small recording head which has only one nozzle 14 to a main scanning direction — it is available suitable also for the equipment using the recording head called as it is wide.

[0045] The example is shown in drawing 3. The example shown in drawing 3 is a recording device which performs image recording by the ink jet recording method using the recording head 36 which has the nozzle 34 of a large number arranged in the main scanning direction (image). In this recording device, conveying television paper P continuously at a predetermined rate in the direction of vertical scanning (the direction of arrow-head Y) which intersects perpendicularly

with a main scanning direction (continuation constant-speed delivery) the ink according to a picture signal is breathed out from each nozzle 34 in it, and an image is recorded on the television paper P in it.

[0046] As shown in drawing 3, this recording head 36 has the light source 38 for detection of the television paper P which extends in the direction downstream of vertical scanning of a nozzle 34 in a main scanning direction, and the photo detector 40 arranged at the homotopic of a main scanning direction corresponding to each nozzle 34. Moreover, as shown in drawing 3, also in this example, it is injected from the light source 38 for detection, and the edge of the television paper P in the location corresponding to each nozzle 34 is detected by detecting the light reflected by the television paper P by the photo detector 40.

[0047] In this recording device, the location of the light source 38 for detection and the location of a photo detector 40 are known like a previous example. Therefore, the probe index to the television paper P of the light which it is injected from the light source 38 for detection, it is reflected by the television paper P, and carries out incidence to a photo detector 40, and the spacing d of the direction of vertical scanning with a nozzle 34 are known, and the bearer rate \*\*\* of the television paper P is known. this equipment — also setting — time delay t=(d/\*\*\*\*)-t; \*\*\*\*\* — after discharge and a photo detector 40 detect the edge by the side of reverse, only a time delay t delays a nozzle 34 to the ink which delays only a time delay t (or pulse) and corresponds after a photo detector 40 detects the edge of the direction of vertical scanning of the television paper P, and the regurgitation of ink is stopped. Moreover, the nozzle 34 for which a photo detector 40 did not detect the television paper P does not carry out the regurgitation of the ink. Therefore, the edge-less print with which the image was recorded to the limit of an edge can be recorded like the above-mentioned example, without carrying out the regurgitation of the ink out of the field of the television paper P.

[0048] Moreover, according to the above-mentioned mode, as shown in drawing 4 (A), it is arranged in a main scanning direction, and two or more edge-less prints can be created using two or more television papers P (television papers Pa, Pb and Pc) conveyed in the direction of vertical scanning at this rate, without soiling the circumference in ink. That is, since two or more prints can be created with the recording device which can create the large print of width of face according to this approach, conveying the narrow television paper P of width of face to two or more coincidence, the capacity of a recording device is fully utilizable. And since the nozzle 14 for which the corresponding photo detector 40 does not detect the television paper P does not carry out the regurgitation of the ink, even if spacing of the television paper P changes, it does not soil the circumference in ink.

[0049] In this example, as shown in drawing 4 (B), the print image data buffer 42 for television paper P conveyance corresponding to said spacing d is formed, for example. From a picture signal 1, it repeats sending to the detection field of this television paper Pb from a picture signals at 2 to the detection field of this television paper Pc, and sending one train of picture signals at a time to the drive circuit 44 of a recording head 36 in order of read-out and read-out one by one from a picture signal 3, respectively to the detection field of the television paper Pa in this print image data buffer 42, and image recording is performed to it. Therefore, the image size of the main scanning direction on a picture signal is shown by Field 2.

[0050] Although the above example has the configuration which formed the detection means of the television paper P in the recording head in one, limitation is not carried out to this but this invention may establish a detection means with another object with a recording head.

[0051] As shown in drawing 5, the usual recording head 46 by which the nozzle 14 was arranged is used in the direction of vertical scanning. For example, by migration to the main scanning direction (A and B) of a recording head 46, and constant \*\*\*\*\* of the television paper P in the equipment which performs image recording of an ink jet recording method, it adds to the same tip detecting element 16 as the above-mentioned example. The equipment which formed detection means 48 (for example, the Rhine CCD sensor, a Rhine-like photosensor, etc.) to detect the edge of the main scanning direction of the television paper P in the scan field by the recording head 46 is illustrated. An edge-less print can be created in this recording device, without carrying out the regurgitation of the ink out of the field of the television paper P by

detecting the existence region of the television paper P and controlling the regurgitation of the ink from a recording head 46 according to this by the detection means' 48 detecting the location of the direction of vertical scanning, and detecting the location of a main scanning direction by control of the tip detecting element 16 and constant \*\*\*\*\*.

[0052] Moreover, although the above example detected the television paper P, acquired existence region information and breathed out ink only to the existence region of the television paper P according to this with the detection means of optical \*\* limitation is not carried out to this, but this inventions are various kinds of means, and can acquire the existence region information on the television paper P. For example, the approach of acquiring existence region information with the size of the television paper P, the method of acquiring the existence region information on the television paper P by the input by the operator, etc. are illustrated.

[0053] As mentioned above, although the image recording approach of this invention and image recording equipment were explained to the detail, in the range in which limitation is not carried out to the above-mentioned example, and this invention does not deviate from the summary of this invention, what may make various kinds of amelioration and modification is natural.

[0054] For example, although the cut sheet is used for the above example as television paper P, this invention may be cut for every one print after image recording, using a web as television paper P (television medium). Moreover, limitation may not be carried out to performing image recording, either, conveying television paper P in the direction of vertical scanning (constant \*\*\*\*\* or continuation conveyance), but a recording head may be moved in the direction of vertical scanning, and image recording may be performed. In addition, in this mode, when using a web as television paper P, as for cutting of a web, it is desirable to carry out, when the recording head has not moved for image recording.

[0055]

[Effect of the Invention] As mentioned above, as explained to the detail, according to this invention, it sets to image recording, such as an ink jet recording method which shifts image formation matter, such as ink, to television media, such as television paper, and performs image recording, the print with an edge[ where until / marginal full / record of the television medium was carried out ]-less image which does not have a white frame etc. in a perimeter can be created without producing the dirt of the equipment by moreover carrying out the regurgitation of the ink out of a television paper field, without using television paper and ink vainly.

[Translation done.]

## \* NOTICES \*

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damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DESCRIPTION OF DRAWINGS

## [Brief Description of the Drawings]

[Drawing 1] It is the conceptual diagram of an example of the image recording equipment of this invention, and (A) shows the block diagram showing the outline of the control section which controls the image recording section (B) is indicated to be to (A) in the schematic diagram of the image recording section, respectively.

[Drawing 2] It is the conceptual diagram of another example of the image recording equipment of this invention, and (A) shows the schematic diagram for explaining an operation of the television paper detection in the image recording section (B) is indicated to be to (A) in the schematic diagram of the image recording section, respectively.

[Drawing 3] It is the conceptual diagram of another example of the image recording equipment of this invention.

[Drawing 4] (A) shows a conceptual diagram for (B) to explain the operation for the conceptual diagram showing another example of the image recording in the image recording section shown in drawing 3, respectively.

[Drawing 5] It is the conceptual diagram of the image recording section of another example of the image recording equipment of this invention.

## [Description of Notations]

- 10 Image Recording Section
- 12, 36, 46 Recording head
- 14 34 Nozzle
- 15 (15a, 15b) 32 (television paper end) Detecting element
- 16 Tip Detecting Element
- 18 38 The light source for detection
- 20 Control Section
- 22 Picture Signal Generating Section
- 24 Record Control Section
- 26 The Record Direction Detecting Element
- 28 Delay Circuit Section
- 30 Edge Signal Selection Section
- 40 Photo Detector
- 48 Detection Means

[Translation done.]